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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/878,325 | 06/12/2001 | Tsuyoshi Kitahara | Q64826 | 2121 |

7590

04/22/2002

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EXAMINER

TRAN, LY T

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 04/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/878,325

Applicant(s)

KITAHARA, TSUYOSHI

Examiner

Ly T TRAN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 7-9, 14, 15, 22, 24 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 10-13, 16-21 and 23 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of species 1: claim 1-6, 10-13, 16-21 and 23 in Paper No. 10 is acknowledged.

Claim Objections

2. Claim 16 is objected to because of the following informalities: missing spelling "vibratos" should be "vibrator". Appropriate correction is required.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "magnitude of electric fields applied to the piezoelectric layers is non-uniform" in claim 1, "a counterbalancing bending moment producing portion" in claim 19 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, there is no structure carry out the function of "magnitude of electric fields applied to the piezoelectric layers is non-uniform"

In claims 19-21 and 23, what is " a counterbalancing bending moment producing portion"

5. Claim 1 recites the limitation "magnitude of electric fields" in line 17. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

With respect to claims 1, 2, 5, 10 and 13, Kitahara discloses a piezoelectric vibrator comprising:

At least one piezoelectric vibrator including:

- Common internal electrode layers (Fig.3: element 4) and segment internal electrode layers arranged alternately (Fig.3: element 3)
- Piezoelectric layers, each interposed between adjacent pair of the common and segment internal electrode layers (Fig.3)
- External electrodes formed on an exterior of the piezoelectric vibrator and electrically connected respectively to the common internal electrode layers and the segment internal electrode layers (Fig.3: element 9)
- A fixing member to which a surface of the piezoelectric vibrator is fixed (Fig.3: element 7)
- The piezoelectric vibrator is displaceable in a direction perpendicular to a lamination direction in which the internal electrode layers and piezoelectric layer are laminated (Fig.3)
- A length of at least one of the internal electrode layer, located away from the surface fixed to the fixing member is shorter than other internal electrode layers (Fig.3).
- Piezoelectric layers are non-uniform in thickness (Fig.3)
- Internal electrode layers are non-uniformed in the thickness (Fig.3)

Since Kitahara discloses that the thickness of the piezoelectric layers are non-uniform then it's inherently having magnitude of electric fields applied to the

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piezoelectric layers is non-uniform and electric fields applied to the piezoelectric layers have respective, different magnitude because of the resistivity is different between two layers with different thickness.

With respect to claim 3, depending on the thickness of piezoelectric layers, if the piezoelectric layer located farther away from a thickness center of the piezoelectric vibrator in the lamination direction is thinner than other piezoelectric layer then the magnitude of an electric field applied to it is smaller than the magnitude of an electric field applied to other piezoelectric layer or if the piezoelectric layer located farther away from a thickness center of the piezoelectric vibrator in the lamination direction is thicker than other piezoelectric layer then the magnitude of an electric field applied to it is larger than the magnitude of an electric field applied to other piezoelectric layer.

With respect to claim 4, Kitahara discloses a piezoelectric layer is located farther from the surface fixed to the fixing member in the lamination direction, magnitude of electric field applied to the piezoelectric layer is smaller (Fig.3), since thickness of the layer that far away from the fixing member is thinner than the layer that closed to the fixing member then the magnitude of electric field applied to the piezoelectric layer is smaller.

With respect to claim 6, Kitahara discloses at least one of the piezoelectric layer located away from the surface fixed to the fixing member is thicker than other piezoelectric layer (Fig.3).

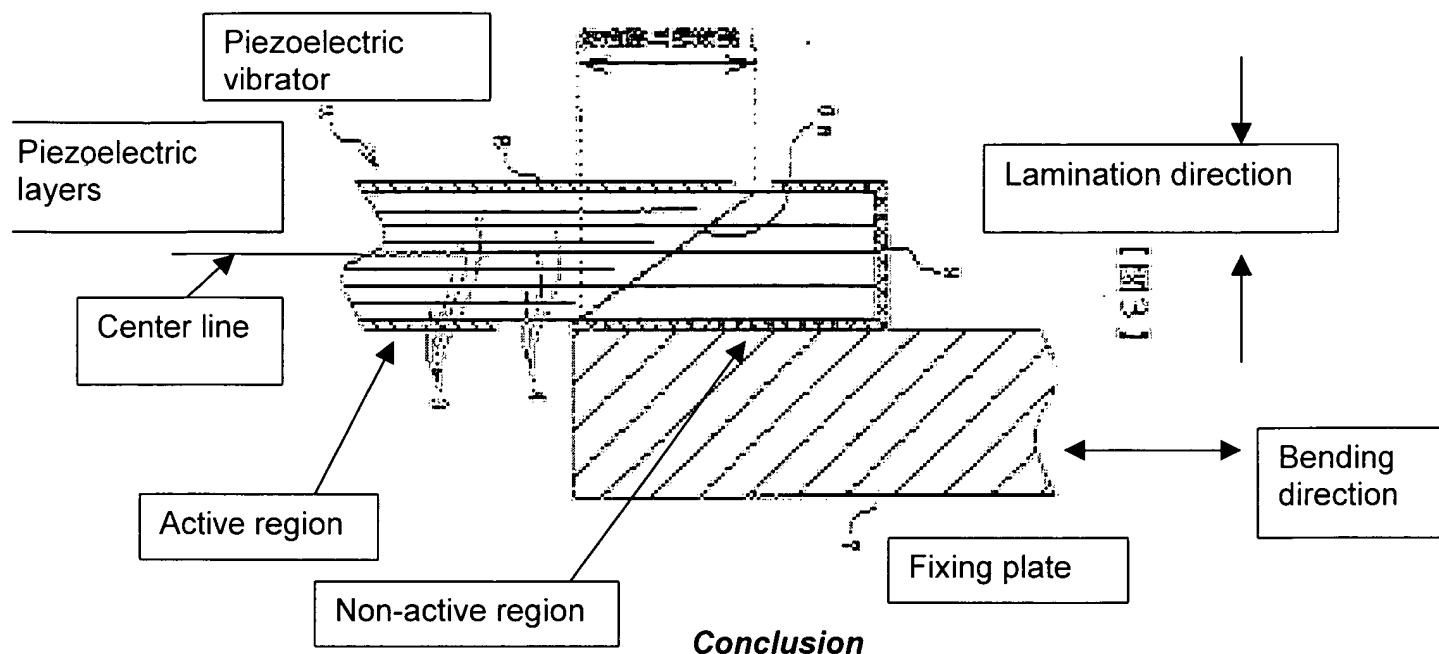
With respect to claim 11, Kitahara discloses at least one of the internal electrode layers located away from a center line in the lamination direction is thicker than other internal electrodes (Fig.3)

With respect to claim 12, Kitahara discloses that an internal electrode layer is located farther from the surface fixed to the fixing member in the lamination direction, the internal electrode layer is thicker (Fig.3)

With respect to claim 16, Kitahara discloses that at least one piezoelectric vibrator includes comb-like piezoelectric vibrator contracting a piezoelectric group (Fig.2).

With respect to claim 17, Kitahara discloses the piezoelectric vibrator further includes a non-active portion that is not expanded or contracted even when the piezoelectric layers in an active region are driven and the fixing member is joined to a side surface of the non-active portion (Fig.3).

With respect to claim 18, Kitahara discloses a flow passage unit having an elastic plate serving as a part of a seal member for sealing a pressure chamber communicated with a nozzle opening wherein the piezoelectric vibrator unit is attached by fixing a distal end face of the piezoelectric vibrator to the elastic plate (Fig.1: element 16).



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ly T TRAN whose telephone number is 703-308-0752. The examiner can normally be reached on M-F (7:30am-5pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 703-308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0967.

lt

April 16, 2002

John Barlow
Supervisory Patent Examiner
Technology Center 2800